

IN THE CLAIMS:

1. A portable containment system for chemical and biological materials, comprising:

a storage container comprising a base section and a removable lid, wherein the base section has upper and lower surfaces and an opening formed in the upper surface of the base section, and wherein the removable lid is placed on the upper surface of the base section for covering the opening in the upper surface of the base section;

a glovebox having top and bottom surfaces, front and rear walls, and first and second sidewalls, wherein the sidewalls have openings formed therein for access to the interior of the glovebox, wherein the glovebox is placed in the storage container when not in use, and wherein the glovebox is removed from the storage container for use;

a first module means releasably secured to the first sidewall of the glovebox for covering the opening in the first sidewall and for providing a means for introducing items into and removing items from the interior of the glovebox, wherein the first module means has a body portion and a flange means extending therefrom for surrounding and sealing the opening in the first sidewall, and wherein the first module means has a storage position where the body portion of the first module is positioned in the interior of the glovebox through the opening in the first sidewall and where the flange means is secured to the first sidewall, and wherein the first module means has an operative position where the body portion is positioned exterior of the glovebox and the flange means is secured to the first sidewall;

a second module means releasably secured to the second sidewall of the glovebox for covering the opening in the second sidewall, wherein the second module means is

selected from the group of a dunk tank, a shelf, and a light unit, wherein the opening in the first sidewall is larger than the opening in the second sidewall and the second module means has dimensions which are less than the dimensions of the opening in the first sidewall for inserting the second module means through the opening in the first sidewall into the interior of the glovebox for storage when the glovebox is not in use;

10 a filter system comprising a filter unit for holding a plurality of gas filters, an outlet conduit extending between and releasably connected to the glovebox and the filter unit, an inlet conduit extending between and releasably connected to the glovebox and the filter unit, and a pump means connected to the filter unit for circulating gas from the glovebox, into the outlet conduit, through the filter unit, and into the inlet conduit, wherein the filter unit comprises:

a housing comprising a bottom surface, a first end wall, a second end wall, sidewalls extending therebetween, and a top surface which has a central opening formed therein, wherein the first and second end walls have passages formed therein;

a first moveable plate means positioned within the interior of the housing adjacent to the first end wall, wherein the first moveable plate means has a duct formed therethrough;

a first adjustment means connected to the first end wall and the first moveable plate means for moving the first moveable plate means relative to the first end wall;

20 a first flexible conduit means connected to and extending between the passage in the first end wall and the duct in the first moveable plate means for carrying gas from the first end wall to the first moveable plate means;

a second moveable plate means positioned within the interior of the housing adjacent to the second end wall; wherein the second moveable plate means has a duct formed therethrough;

a second adjustment means connected to the second end wall and the second moveable plate means for moving the second moveable plate means relative to the second end wall;

a second flexible conduit means connected to and extending between the passage in the second end wall and the duct in the second moveable plate means for carrying gas from the second moveable plate means to the second end wall, wherein filter units are
10 positioned in the housing between the first and second moveable plate means and the first and second adjustment means are utilized to move the first and second moveable plate means towards each other to clamp the filter elements therebetween; and

bag means releasably secured around the central opening of the housing for sealing the opening of the housing.

2. The containment system according to claim 1, wherein the body portion of the first module means comprises a box having an entrance door and an exit door so that when items are to be inserted into the interior of the glovebox, the entrance door is opened to insert an item into the box and the exit door is opened to move the item into the interior of the glovebox only after the entrance door is closed, and air filters connected to the box
20 for filtering air in the box.

3. A portable containment system for chemical and biological materials, comprising:

a storage container comprising a base section and a removable lid, wherein the base section has upper and lower surfaces and an opening formed in the upper surface of

the base section, and wherein the removable lid is placed on the upper surface of the base section for covering the opening in the upper surface of the base section;

a glovebox having top and bottom surfaces, front and rear walls, and first and second sidewalls, wherein the sidewalls have openings formed therein for access to the interior of the glovebox, wherein the glovebox is placed in the storage container when not in use, and wherein the glovebox is removed from the storage container for use;

10 a first module means releasably secured to the first sidewall of the glovebox for covering the opening in the first sidewall and for providing a means for introducing items into and removing items from the interior of the glovebox, wherein the first module means has a body portion and a flange means extending therefrom for surrounding and sealing the opening in the first sidewall, and wherein the first module means has a storage position where the body portion of the first module is positioned in the interior of the glovebox through the opening in the first sidewall and where the flange means is secured to the first sidewall, and wherein the first module means has an operative position where the body portion is positioned exterior of the glovebox and the flange means is secured to the first sidewall; and

a second module means releasably secured to the second sidewall of the glovebox for covering the opening in the second sidewall.

20 4. The containment system according to claim 3, wherein the second module means is selected from the group of a dunk tank, a shelf, and a light unit.

5. The containment system according to claim 3, wherein the opening in the first sidewall is larger than the opening in the second sidewall and the second module means has dimensions which are less than the dimensions of the opening in the first sidewall for

inserting the second module means through the opening in the first sidewall into the interior of the glovebox for storage when the glovebox is not in use.

6. The containment system according to claim 5, wherein the second module means is selected from the group of a dunk tank, a shelf, and a light unit.

7. The containment system according to claim 5, further comprising an outlet conduit formed in the rear wall of the glovebox for conveying gas from the glovebox and a plurality of gas deflecting baffles which are releasably secured to and spaced from the rear wall of the glovebox.

8. The containment system according to claim 5, further comprising a filter system, an
10 outlet conduit extending between and releasably connected to the glovebox and the filter unit, an inlet conduit extending between and releasably connected to the glovebox and the filter unit, and a pump means connected to the filter unit for circulating gas from the glovebox, into the outlet conduit, through the filter unit, and into the inlet conduit.

9. The containment system according to claim 8, wherein the filter system comprises a filter housing unit for holding a plurality of gas filters, comprising:

a housing comprising a bottom surface, a first end wall, a second end wall, sidewalls extending therebetween, and a top surface which has a central opening formed therein, wherein the first and second end walls have passages formed therein;

a first moveable plate means positioned within the interior of the housing adjacent
20 to the first end wall, wherein the first moveable plate means has a duct formed therethrough;

a first adjustment means connected to the first end wall and the first moveable plate means for moving the first moveable plate means relative to the first end wall;

a first flexible conduit means connected to and extending between the passage in the first end wall and the duct in the first moveable plate means for carrying gas from the first end wall to the first moveable plate means;

a second moveable plate means positioned within the interior of the housing adjacent to the second end wall; wherein the second moveable plate means has a duct formed therethrough;

a second adjustment means connected to the second end wall and the second moveable plate means for moving the second moveable plate means relative to the second end wall;

10 a second flexible conduit means connected to and extending between the passage in the second end wall and the duct in the second moveable plate means for carrying gas from the second moveable plate means to the second end wall, wherein filter units are positioned in the housing between the first and second moveable plate means and the first and second adjustment means are utilized to move the first and second moveable plate means towards each other to clamp the filter elements therebetween; and

bag means releasably secured around the central opening of the housing for sealing the opening of the housing.

10. The containment system according to claim 5, wherein the body portion of the first module means comprises a box having an entrance door and an exit door, wherein to
20 insert an item into the interior of the glovebox, the entrance door is opened to insert an item into the box and the exit door is opened to move the item into the interior of the glovebox only after the entrance door is closed

11. The containment system according to claim 10, further comprising air filters connected to the box for filtering air drawn into the box.

12. The containment system according to claim 3, further comprising a filter system, an outlet conduit extending between and releasably connected to the glovebox and the filter unit, an inlet conduit extending between and releasably connected to the glovebox and the filter unit, and a pump means connected to the filter unit for circulating gas from the glovebox, into the outlet conduit, through the filter unit, and into the inlet conduit

13. The containment system according to claim 12, wherein the filter system comprises a filter housing unit for holding a plurality of gas filters, comprising:

10 a housing comprising a bottom surface, a first end wall, a second end wall, sidewalls extending therebetween, and a top surface which has a central opening formed therein, wherein the first and second end walls have passages formed therein;

 a first moveable plate means positioned within the interior of the housing adjacent to the first end wall, wherein the first moveable plate means has a duct formed therethrough;

 a first adjustment means connected to the first end wall and the first moveable plate means for moving the first moveable plate means relative to the first end wall;

 a first flexible conduit means connected to and extending between the passage in the first end wall and the duct in the first moveable plate means for carrying gas from the
20 first end wall to the first moveable plate means;

 a second moveable plate means positioned within the interior of the housing adjacent to the second end wall; wherein the second moveable plate means has a duct formed therethrough;

a second adjustment means connected to the second end wall and the second moveable plate means for moving the second moveable plate means relative to the second end wall;

a second flexible conduit means connected to and extending between the passage in the second end wall and the duct in the second moveable plate means for carrying gas from the second moveable plate means to the second end wall, wherein filter units are positioned in the housing between the first and second moveable plate means and the first and second adjustment means are utilized to move the first and second moveable plate means towards each other to clamp the filter elements therebetween; and

10 bag means releasably secured around the central opening of the housing for sealing the opening of the housing.

14. The containment system according to claim 13, wherein the front of the glovebox is provided with glove ports to receive the users hands and arms.

15. A portable containment for chemical and biological materials, comprising:

a glovebox having top and bottom surfaces, front and rear walls, and first and second sidewalls, wherein the sidewalls have openings formed therein for access to the interior of the glovebox, and wherein the front wall is provided with glove ports for extending a users hands and arms into the interior of the glovebox;

20 a first module means releasably secured to the first sidewall of the glovebox for covering the opening in the first sidewall and for providing a means for introducing items into and removing items from the interior of the glovebox, wherein the first module means has a body portion and a flange means extending therefrom for surrounding and sealing the opening in the first sidewall; and

a second module means releasably secured to the second sidewall of the glovebox for covering the opening in the second sidewall, wherein the opening in the first sidewall is larger than the opening in the second sidewall and the second module means has dimensions which are less than the dimensions of the opening in the first sidewall for inserting the second module means through the opening in the first sidewall into the interior of the glovebox for storage when the glovebox is not in use.

16. The containment system according to claim 15, wherein the second module means includes at one selected from the group of a dunk tank, a shelf, and a light unit.

10 17. The containment system according to claim 15, wherein the first module means has a storage position where the body portion of the first module is positioned within the interior of the glovebox through the opening in the first sidewall and where the flange means is secured to the first sidewall, and wherein the first module means has an operative position where the body portion is positioned exterior of the glovebox and the flange means is secured to the first sidewall

18. The containment system according to claim 15, further comprising an outlet conduit formed in the rear wall of the glovebox for conveying gas from the glovebox and a plurality of gas deflecting baffles which are releasably secured to and spaced from the rear wall of the glovebox.

20 19. The containment system according to claim 15, further comprising a filter system, an outlet conduit extending between and releasably connected to the glovebox and the filter unit, an inlet conduit extending between and releasably connected to the glovebox and the filter unit, and a pump means connected to the filter unit for circulating gas from the glovebox, into the outlet conduit, through the filter unit, and into the inlet conduit.

20. The containment system according to claim 19, wherein the filter system comprises a filter housing unit for holding a plurality of gas filters, comprising:

a housing comprising a bottom surface, a first end wall, a second end wall, sidewalls extending therebetween, and a top surface which has a central opening formed therein, wherein the first and second end walls have passages formed therein;

a first moveable plate means positioned within the interior of the housing adjacent to the first end wall, wherein the first moveable plate means has a duct formed therethrough;

10 a first adjustment means connected to the first end wall and the first moveable plate means for moving the first moveable plate means relative to the first end wall;

a first flexible conduit means connected to and extending between the passage in the first end wall and the duct in the first moveable plate means for carrying gas from the first end wall to the first moveable plate means;

a second moveable plate means positioned within the interior of the housing adjacent to the second end wall; wherein the second moveable plate means has a duct formed therethrough;

20 a second adjustment means connected to the second end wall and the second moveable plate means for moving the second moveable plate means relative to the second end wall;

a second flexible conduit means connected to and extending between the passage in the second end wall and the duct in the second moveable plate means for carrying gas from the second moveable plate means to the second end wall, wherein filter units are

positioned in the housing between the first and second moveable plate means and the first and second adjustment means are utilized to move the first and second moveable plate means towards each other to clamp the filter elements therebetween; and

bag means releasably secured around the central opening of the housing for sealing the opening of the housing.

21. The containment system according to claim 15, wherein the body portion of the first module means comprises a box having an entrance door and an exit door, wherein to insert an item into the interior of the glovebox, the entrance door is opened to insert an item into the box and the exit door is opened to move the item into the interior of the glovebox only after the entrance door is closed

22. The containment system according to claim 21, further comprising air filters connected to the box for filtering air drawn into the box.

23. A containment system for chemical and biological materials, comprising:

a glovebox having top and bottom surfaces, front and rear walls, and first and second side walls, wherein the sidewalls have openings formed therein, and wherein the glovebox is provided with inlet and outlet ports;

a first module means secured to the first sidewall of the glovebox for covering the opening in the first sidewall and for providing a means for introducing items into the glovebox, wherein the first module means has a body portion and a flange means extending therefrom for surrounding the opening in the first sidewall and for sealing the first module means to the glovebox;

a second module means secured to the second sidewall of the glovebox for covering the opening in the second sidewall; and

a filter unit for recirculating and cleansing the air in the glovebox, an outlet conduit extending between and releasably connected to the glovebox and the filter unit, an inlet conduit extending between and releasably connected to the glovebox and the filter unit, and a pump means connected to the filter unit for circulating air from the glovebox, into the outlet conduit, through the filter unit, and into the inlet conduit

24. The containment system according to claim 23, wherein the filter unit comprises:

a filter housing for holding a plurality of gas filters, wherein the housing comprises a bottom surface, a first end wall, a second end wall, sidewalls extending therebetween, and a top surface which has a central opening formed therein, wherein the
10 first and second end walls have passages formed therein;

a first moveable plate means positioned within the interior of the housing adjacent to the first end wall, wherein the first moveable plate means has a duct formed therethrough;

a first adjustment means connected to the first end wall and the first moveable plate means for moving the first moveable plate means relative to the first end wall;

a first flexible conduit means connected to and extending between the passage in the first end wall and the duct in the first moveable plate means for carrying gas from the first end wall to the first moveable plate means;

a second moveable plate means positioned within the interior of the housing
20 adjacent to the second end wall; wherein the second moveable plate means has a duct formed therethrough;

a second adjustment means connected to the second end wall and the second moveable plate means for moving the second moveable plate means relative to the second end wall;

a second flexible conduit means connected to and extending between the passage in the second end wall and the duct in the second moveable plate means for carrying gas from the second moveable plate means to the second end wall, wherein filter units are positioned in the housing between the first and second moveable plate means and the first and second adjustment means are utilized to move the first and second moveable plate means towards each other to clamp the filter elements therebetween; and

10 bag means releasably secured around the central opening of the housing for sealing the opening of the housing.

25. A method for detecting leakage of air from a containment system including a glovebox, an air filtration unit containing filter elements, conduit means connecting the glovebox to the filtration unit, air pressure detectors connected to the glovebox and the filtration unit, pump means for circulating air through the containment system, and alarm means for indicating a leakage of air from the containment system, comprising the steps of:

measuring the air pressure in the glovebox;

measuring the air pressure in the filtration unit;

20 detecting the difference in air pressures in the glovebox and the filtration system;

and

activating the alarm means if the detected difference in air pressures exceeds a predetermined value.

26. The method according to claim 25 where a gas pressure detector is connected to a filter element and the air pressure is measured at the filter element.

27. The method according to claim 25 where an air flow meter is connected to a filter element and further comprising the steps of:

measuring the air flow through the filter unit;

recording the measured air flow; and

activating the alarm means if the change in the recorded air flows in a predetermined period of time exceeds a predetermined value.

10 28. A method for controlling the air flow through a containment system used for chemical and biological testing, where the containment system includes a glovebox having an opening formed in a sidewall, a module means secured to the sidewall of the glovebox for covering the opening and wherein the module means has outer and inner doors for introducing items into the glovebox, an air filtration unit, conduit means connecting the glovebox to the filtration unit and the module means to the filtration unit, valve means for controlling the flow of air through the conduit means, air pressure monitors for monitoring the air pressure within the containment system, and pump means for circulating air through the containment system, comprising the steps of:

measuring the air pressure in the glovebox;

20 measuring the air pressure in the filtration unit; measuring the air pressure in the filtration unit;

detecting the difference in air pressures in the glovebox and the filtration system;
and

stopping the pump means and closing the valve means to stop the flow of air between the glovebox and the filtration unit and the module means and the filtration unit where the difference in air pressures in the glovebox and the filtration unit exceeds a predetermined value..

29. A method of storing a glovebox system in a compact manner when not in use, wherein the glovebox system includes a glovebox having first and second openings formed in the sidewalls for access to the interior of the glovebox and the first opening is larger than the second opening; a first module means releasably secured to the first sidewall of the glovebox for covering the opening in the first sidewall and for providing a means for introducing items into and removing items from the interior of the glovebox, wherein the first module means has a body portion and a flange means extending therefrom for surrounding and sealing the first opening, and wherein the first module means has a storage position where the body portion of the first module is positioned in the interior of the glovebox through the opening in the first sidewall and where the flange means is secured to the first sidewall, and wherein the first module means has an operative position where the body portion is positioned exterior of the glovebox and the flange means is secured to the first sidewall; a second module means releasably secured to the second sidewall of the glovebox for covering the opening in the second sidewall, wherein the second module means includes one or more of a dunk tank, a shelf, a light unit, a power unit, test equipment or a panel wherein the opening in the first sidewall is larger than the opening in the second sidewall and the second module means has dimensions which are less than the dimensions of the opening in the first sidewall for inserting the second module means through the opening in the first sidewall into the

interior of the glovebox for storage when the glovebox is not in use; comprising the steps of:

disconnecting the first module means from the glovebox;

inserting the second module means through the first opening into the interior of the glovebox for storing the second module means in the interior of the glovebox;

moving the first module means to a storage position where the body portion of the first module means is inserted into the interior of the glovebox; and

securing the flange of the first module means to the glovebox.